

CLAIMS

- Sub B6
1. A head tracker system for determining a user's head orientation relative to a datum (22) comprising: a head mounting (2) for attachment to the user's head; an optical sensor (12) which in use is located in fixed relation with a known fixed point relative to the head mounting (2); a plurality of distinguishable markings (18a-18j) each of which when in use is located in fixed relation with a respective known point which is fixed relative to the datum (22); characterised by an optical correlator (26) for optically correlating the optical image from the optical sensor (12) with an optical image representative of at least one of said markings (18a-18j); and means (28) for determining the orientation of the head mounting using the output from the optical correlator when it detects that there is correlation between the images.
2. A head tracker system for determining a user's head orientation relative to a datum (22) comprising: a head mounting (2) for attachment to the user's head; a plurality of distinguishable markings (18a-18j) each of which when in use is located in fixed relation with a respective known point which is fixed relative to the head mounting; an optical sensor (12) which in use is located in fixed relation with a known fixed point relative to the datum (22); characterised by an optical correlator (26) for optically correlating the optical image from the optical sensor (12) with an optical image representative of at least one of said markings (18a-18j); and means (28) for determining the orientation of the head mounting (2) using the output from the optical correlator (26) when it detects that there is

correlation between the images.

3. A head tracker according to Claim 1 or Claim 2 in which the, or each, distinguishable marking (18a-18j) comprises a spatial pattern.
4. A head tracker system according to any preceding claim in which the, or each, distinguishable marking (18a-18j) is defined in part at least by the colour of the marking.
5. A head tracker system according to any preceding claim and further comprising one or more marking generators (18a-18j) for generating the distinguishable markings.
6. A head tracker system according to Claim 5 in which the colour of the markings (18a-18j) is defined by the wavelength of the light produced by each marking generator.
7. A head tracker according to any preceding claim in which each marking is a substantially collimated image having an axis (20a-20j) which is predetermined and which passes through said respective known fixed point.
8. A head tracker system according to Claim 1 or any one of Claims 3 to 7 when dependent on Claim 1 in which the plurality of markings comprises features of the environment around the user.

9. A head tracker system according to any preceding claim in which the optical correlator (26) is operable to sequentially, optically correlate the optical image from the optical sensor with an optical image representative of each of the markings.
10. A head tracker system according to any preceding claim in which the means (28) for determining the orientation of the head mounting (2) determines the head mounting orientation by determining where within the field of view of the optical sensor a marking is located.
11. A head tracker system according to any preceding claim in which the optical sensor (12) comprises a video camera for capturing the optical image and producing an electrical signal representative of it and converting the electrical signal back to an optical image.
12. A head tracker system according to any preceding claim and further comprising a second optical sensor located at a second known fixed point relative to the head mounting or to the fixed datum.
13. A head tracker system according to any preceding claim in which the optical correlator (26) is a Vander Lugt type correlator.
14. A head tracker system according to any one of Claims 1 to 12 in which the

optical correlator (28) is of the joint transform type.

15. A head tracker system for determining a user's head orientation relative to a datum (22) comprising: a head mounting (2) for attachment to the user's head; characterised by an optical sensor (12) which in use is located at a known point fixed relative to the head mounting (2) and operable to collect optical scene data representative of the user's environment; an optical correlator (26) for correlating said optical scene data with optical scene data previously captured by said optical sensor to determine the relative movement of the head mounting (2) between the capture of said optical scene data; and means (28) for determining the orientation of the head mounting from said relative movements.
16. A head tracker system according to Claim 15 when used in an aircraft in which the environment comprises at least a part of the cockpit.
17. A head tracker system according to Claim 15 or Claim 16 and further comprising providing one or more visibly distinguishable markings (18a- 18j) at respective known points which are fixed relative to the datum (22).